

2 concub.
(c) the measures according to step (b) are optionally repeated with one or several further antigens or antigen mixtures which are specific for one or several further types of antibodies to be examined, the further antigens or antigen mixtures each being spatially separate from the antigens or antigen mixtures used in previous steps.

(d) a second aliquot of the sample liquid is optionally contacted with several immobilized antigens or antigen mixtures according to steps (a) to (c) in which the sequence of antigens or antigen mixtures is, however, different.

(e) the respective immunological reactivity of the immobilized antigens or antigen mixtures with the sample liquid is determined qualitatively or/and quantitatively and

(f) a typing of the antibodies present in the sample liquid is carried out based on the reactivity determination.

✓ Please delete claims 1-10 without prejudice or disclaimer.

REMARKS

This application is a divisional under 35 U.S.C. §1.53(b) of application Serial Number 08/845,926, filed April 28, 1997.

The above amendments to the claims have been made to correct multiple dependency of the claims and to put the application in better condition for examination.

By this amendment, applicants amend the specification by renumbering pages 1-6 containing claims 1-28 as pages 51-56, by inserting a Sequence Listing as pages 24-50 and by designating the sequences described in the specification with reference to the sequence identity number as contained in the Sequence Listing.

A

A paper copy of the Sequence Listing is submitted herewith. Applicants' undersigned representative hereby states, pursuant to 37 C.F.R. §1.821 *et seq.*, that the aforementioned submission of the Sequence Listing includes no new matter.

It is respectfully submitted that the foregoing amendments and remarks place the application in compliance with 37 C.F.R. §1.821 through §1.825 and substantive examination of the claims of the application is earnestly solicited.

Should any additional information be required, please contact applicants' undersigned representative at the telephone number listed below.

In the event this paper is not timely filed, applicants hereby petition for an appropriate extension of time. The fee for this extension may be charged to our Deposit Account No. 14-1060, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

NIKAIDO, MARMELESTEIN, MURRAY & ORAM LLP



Richard J. Berman
Attorney for Applicants
Registration No. 39,107

Atty. Docket No. P564-9016

Metropolitan Square
655 Fifteenth Street, N.W.
Suite 330 - G Street Lobby
Washington, D.C. 20005-5701
(202) 638-5000

RJB:ccb

A

(1) GENERAL INFORMATION:

(i) APPLICANT:

- (A) NAME: Boehringer Mannheim GmbH
- (B) STREET: Sandhofer Strasse 112 - 132
- (C) CITY: Mannheim
- (E) COUNTRY: DE
- (F) POSTAL CODE (ZIP): 68305

(ii) TITLE OF INVENTION: Method for serological typing using type-specific antigens

(iii) NUMBER OF SEQUENCES: 30

(iv) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk
- (B) COMPUTER: IBM PC compatible
- (C) OPERATING SYSTEM: PC-DOS/MS-DOS
- (D) SOFTWARE: PatentIn Release #1.0, Version #1.30 (EPO)

(vi) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: DE 195 04 302.2
- (B) FILING DATE: 09-FEB-1995

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

Glu	Thr	His	Val	Thr	Gly	Gly	Ser	Ala	Gly	His	Thr	Val	Ser	Gly	Phe
1				5					10					15	
Val	Ser	Leu	Leu	Ala	Pro	Gly	Ala	Lys	Gln	Asn	Val	Gln	Leu	Ile	
		20					25					30			

(2) INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

Glu Thr His Val Thr Gly Gly Asn Ala Gly Arg Thr Thr Ala Gly Leu
1 5 10 15
Val Gly Leu Leu Thr Pro Gly Ala Lys Gln Asn Ile Gln Leu Ile
20 25 30

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

His Thr Arg Val Thr Gly Gly Val Gln Gly His Val Thr Ser Thr Leu
1 5 10 15
Thr Ser Leu Phe Arg Pro Gly Ala Ser Gln Lys Ile Gln Leu Val
20 25 30

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

His Thr His Val Thr Gly Gly Arg Val Ala Ser Ser Thr Gln Ser Leu
1 5 10 15
Val Ser Trp Leu Ser Gln Gly Pro Ser Gln Lys Ile Gln Leu Val
20 25 30

(2) INFORMATION FOR SEQ ID NO: 5:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

Asp Thr His Val Thr Gly Gly Ala Gln Ala Lys Thr Thr Asn Arg Leu
1 5 10 15
Val Ser Met Phe Ala Ser Gly Pro Ser Gln Lys Ile Gln Leu Ile
 20 25 30

(2) INFORMATION FOR SEQ ID NO: 6:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

Glu Thr His Val Thr Gly Gly Ser Ala Gly His Thr Val Ser Gly Phe
1 5 10 15
Val Ser Leu Leu Ala Pro Gly Ala Lys Gln Asn Val Gln Leu Ile
 20 25 30

(2) INFORMATION FOR SEQ ID NO: 7:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

- (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

Gln Thr His Thr Val Gly Gly Ser Thr Ala His Asn Ala Arg Thr Leu
1 5 10 15
Thr Gly Met Phe Ser Leu Gly Ala Arg Gln Lys Ile Gln Leu Ile
 20 25 30

(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 31 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:
(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

Thr	Thr	Tyr	Ser	Ser	Gly	Gln	Glu	Ala	Gly	Arg	Thr	Val	Ala	Gly	Phe
1				5					10					15	
Ala	Gly	Leu	Phe	Thr	Thr	Gly	Ala	Lys	Gln	Asn	Leu	Tyr	Leu	Ile	
		20						25					30		

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS:
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:
(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

Ser	Thr	Gln	Val	Thr	Gly	Gly	Gln	Ala	Ala	His	Thr	Val	Arg	Gly	Val
1				5					10					15	
Ala	Ser	Ile	Phe	Ser	Pro	Gly	Ser	Arg	Gln	Asp	Ile	Ser	Leu	Ile	
		20						25					30		

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS:
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:
(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

Ser	Thr	Ile	Val	Ser	Gly	Gly	Thr	Val	Ala	Arg	Thr	Thr	His	Ser	Leu
1				5					10					15	
Ala	Ser	Leu	Phe	Thr	Gln	Gly	Ala	Ser	Gln	Lys	Ile	Gln	Leu	Ile	
		20						25					30		

(2) INFORMATION FOR SEQ ID NO: 11:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 22 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS:
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

Thr Ala Ser Arg Gln Ala Glu Val Ile Ala Pro Ala Val Gln Thr Asn
1 5 10 15

Trp Gln Lys Leu Glu Thr
20

(2) INFORMATION FOR SEQ ID NO: 12:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

Thr Ala Ser Arg His Ala Glu Val Ile Thr Pro Ala Val Gln Thr Asn
1 5 10 15

Trp Gln Lys Leu Glu Val
20

(2) INFORMATION FOR SEQ ID NO: 13:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser Lys
1 5 10 15

Trp Arg Ala Leu Glu Val
20

(2) INFORMATION FOR SEQ ID NO: 14:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

Gln Ala Ser Lys Gln Ala Gln Asp Ile Gln Pro Ala Val Gln Ala Ser
1 5 10 15
Trp Pro Lys Val Glu Gln
20

(2) INFORMATION FOR SEQ ID NO: 15:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

Gln Ala Thr Arg Gln Ala Gln Asp Ile Gln Pro Ala Ile Gln Ser Ser
1 5 10 15
Trp Pro Lys Leu Glu Gln
20

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 22 amino acids

(B) TYPE: amino acid

(C) STRANDEDNESS:

(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

Thr Ala Thr Lys Gln Ala Glu Ala Ala Ala Pro Val Val Glu Ser Lys
1 5 10 15
Trp Arg Thr Leu Glu Ala
20

(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 20 amino acids

- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

Ala Asn His Asp Ser Pro Asp Ala Glu Leu Ile Glu Ala Asn Leu Leu
1 5 10 15

Trp Arg Gln Glu
20

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

Thr His His Asp Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu
1 5 10 15

Trp Arg Gln Glu
20

(2) INFORMATION FOR SEQ ID NO: 19:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 20 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

Thr His His Val Ser Pro Asp Ala Asp Leu Ile Glu Ala Asn Leu Leu
1 5 10 15

Trp Arg Gln Glu
20

(2) INFORMATION FOR SEQ ID NO: 20:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 16 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS:
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

- (vi) ORIGINAL SOURCE:
 (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

Thr	His	Gly	Lys	Ala	Tyr	Asp	Val	Asp	Met	Val	Asp	Ala	Asn	Leu	Phe
1			5						10					15	

(2) INFORMATION FOR SEQ ID NO: 21:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 16 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS:
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

- (vi) ORIGINAL SOURCE:
 (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

Thr	His	Lys	Thr	Ala	Tyr	Asp	Cys	Asp	Met	Val	Asp	Ala	Asn	Leu	Phe
1			5						10					15	

(2) INFORMATION FOR SEQ ID NO: 22:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 20 amino acids
 (B) TYPE: amino acid
 (C) STRANDEDNESS:
 (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

- (vi) ORIGINAL SOURCE:
 (A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

Thr	Arg	His	Thr	Pro	Pro	Asp	Ala	Asp	Leu	Ile	Glu	Ala	Asn	Leu	Leu
1			5						10					15	
Trp	Arg	Gln	Glu												
			20												

(2) INFORMATION FOR SEQ ID NO: 23:

- (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 18 amino acids

- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

Pro Glu Gln Val Glu Leu Gln Pro Pro Pro Gln Gly Gly Val Val Thr
1 5 10 15

Pro Gly

(2) INFORMATION FOR SEQ ID NO: 24:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

Phe Glu Pro Val Gly Ser Ala Pro Pro Ser Glu Gly Glu Cys Glu Val
1 5 10 15

Ile Asp

(2) INFORMATION FOR SEQ ID NO: 25:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

Ala Glu Leu Ala Thr Arg Ser Phe Gly
1 5

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid

- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

Ala Glu Leu Ala Thr Lys Ser Phe Gly
1 5

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 9 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

Ala Glu Leu Ala Thr Lys Thr Phe Gly
1 5

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 13 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

Gln Gln Leu Ala Ile Lys Ser Phe Gly Gln Pro Pro Pro
1 5 10

(2) INFORMATION FOR SEQ ID NO: 29:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 13 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS:
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

Arg Glu Met Ala Asp Lys Val Leu Ser Pro Leu Gln Asp
1 5 10

(2) INFORMATION FOR SEQ ID NO: 30:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 9 amino acids
(B) TYPE: amino acid
(C) STRANDEDNESS:
(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: peptide

(vi) ORIGINAL SOURCE:

(A) ORGANISM: Hepatitis C Virus

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

Ala Glu Leu Ala Thr Lys Thr Phe Gly
1 5